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## HABIT.<sup>1</sup>

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A habit, from the standpoint of psychology, is a more or less fixed way of thinking, willing, or feeling acquired through previous repetition of a mental experience. A freshman goes up to college with little love for the institution. He soon assumes the conventional attitude of "loyalty to Alma Mater." The experience is repeated time and again through his college life, and this feeling attitude becomes habitual. The habit, strictly speaking, is the similar form as regards feeling which consciousness repeatedly takes; it is the fixed way in which the stream of mind flows when these familiar feeling processes form its content. It is not the familiar feeling consciousness itself; it is simply the proceeding of mind in such a way that the familiar processes are in consciousness.

The physician acquires a volitional habit of taking the pulse and asking patients certain questions. The habit is the familiar way in which his consciousness runs its course during a diagnosis. It is not the familiar consciousness corresponding to the diagnosis. It is the familiar shaping which consciousness takes, as distinguished from the processes which make it up. The conscious habitual content is not unimportant in a study of habit, as we shall see presently; but habit in itself lies outside consciousness. It implies simply an accustomed way of reacting.

Again, the lawyer has a habit of thinking in terms of law. If a problem is presented, he thinks at once of its legal aspects, and his conclusions are reached by the logic of law. In this

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<sup>1</sup> From the Psychological Seminary of Cornell University.

habit of thought, as in the habits of volition and of feeling just cited, habit is a particular shaping which consciousness shows. It is not a conscious process or processes. To express in a word that habit means the accustomed way of feeling, willing, or doing; the more or less fixed course of consciousness with repeated experiences; the shaping of the familiar consciousness rather than that consciousness itself; one may say that habit is the mode of mental functioning when repeated processes are in mind. Just as memory is, strictly, the way in which the mind reacts when we are remembering, and not the conscious content remembered, and just as imagination is the peculiar shaping of consciousness when we build air castles and create poetic thought, so habit is the way consciousness runs its course when familiar processes are experienced. We may define habit, therefore, as that mode of mental functioning in which repeated processes are predominant in consciousness. Psychology commonly considers volition, feeling, and intellection, the three typical functions of mind. Every mental experience may be subsumed under one of these three categories. Alongside this tripartite classification, there may be placed another division, habitual and non-habitual functioning. Under the former are included all repeated mental experiences; under the latter, all novel experiences. It may be reiterated that these functions are not themselves conscious processes; they are simply types of consciousness, forms of reacting, which find expression in the arrangement or distribution of the processes of consciousness. Every mental process may be classed therefore as the expression of a function of volition, intellection, or feeling; and, at the same time, of habitual or non-habitual functioning. This view of habit as the mental function, or general type of mentation, under which are to be included all repeated conscious experiences, will serve to give us our bearings as we consider some of the literature on habit.

#### LITERATURE ON HABIT.

To review, even in a cursory way, all that has been written on habit, lies outside the limits of this paper. We can only indicate here its place in modern psychology. In preface, it may be noted that two distinct general standpoints are coming to be recognized in psychology. There is on the one hand a psychology of structure which studies consciousness as a structure, abstracting from its relations to the individual and his environment, resolves it into structural elements, sensations and affections, and aims to discover their complexes and interconnections; there is on the other hand, a psychology of function which regards conscious processes as functions of the psychophysical organism, just as digestion is a function, with

objective reference in the environment, and with meaning to the organism. This distinction will be illuminating in our study of habit.

James' discussion of habit seems on the whole the most adequate.<sup>1</sup> Yet it is exclusively a functional treatment of the problem. The basis of habit, he says, is physiological. Consciousness has for its substrate the higher nervous centers which "grow to the modes in which they have been exercised." When a mental process passes through the mind, a characteristic nervous excitation occurs in the brain. The latter in its passage through the nervous tissue leaves a trace which facilitates the repetition of the same nervous process. Hence, the corresponding mental process is likely to reappear. With further repetition, the path in the nervous centers deepens, and its mental correlate is experienced with corresponding greater ease. As to the results of habit, he notes, (1) that with actions, it "simplifies the movements required to achieve a given result, makes them more accurate, and diminishes fatigue;" (2) that, on the side of consciousness, it "diminishes the conscious attention with which our acts are performed." The value of habit to the psychophysical organism is emphasized, in that it makes automatic and subject to routine the greater part of the actions, attitudes, and mental processes of daily life. Three conditions favoring the development of habit are stated: (1) "We must launch ourselves with as strong and decided an initiative as possible." (2) "Never suffer an exception to occur till the new habit is securely rooted in your life." (3) "Seize every opportunity to act on every resolution you make, and on every emotional prompting you may experience in the direction of habits you aspire to gain."

In this systematic treatment of habit, James throws the entire emphasis on the functional side of the problem. Habit is discussed in its meaning to the individual, as it manifests itself in the routine of daily life, in such accustomed movements as walking and dancing, and in the habitual ways of thinking and reacting which give expression to character. All this is mind considered, not as structure, but with reference to the individual and his environment. James does show that habit means diminished attention, and that habituated complex movements run their course as a chain of processes in which the

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<sup>1</sup>James: *Principles of Psychology*, 1890, I, 104-127. The treatment of habit given by James might be criticised from the standpoint of psychological exposition, for its emphasis upon the "ethical implications of habit," a characteristic due doubtless to its original publication as a magazine article for popular reading. This very characteristic, however, makes James' chapter on habit, the more valuable for certain readers, *e. g.*, the teacher.

perception arising from each link acts, without conscious direction, as a cue and stimulus to the next. These last facts might be given a structural interpretation, but James' point of view is functional, his exposition is of the meaning of these facts to the psychophysical organism. There remains unsolved by James' statement, the structural problem: what does habit mean for consciousness; does consciousness show one pattern when functioning habitually and another when functioning non-habitually?

The accounts of habit by Sully and Stout also merit attention. Sully says, all "repeated or recurring processes of thought and action become more perfectly organized, and as a consequence, more rapid and unconscious or automatic. This result is expressed by the term habit."<sup>1</sup> The basis for habit, as with James, is physiological. He says that "the characteristic note of habit is mechanicality;" and that "the volitional process in its complete, fully conscious form is restricted to new, or, at least infrequent actions." Sully gives as criteria of the oncoming of habit: (1) Repetition tends to remove all sense of effort, and to render the movement easy, through muscular and nervous adjustment; (2) there is a consolidation of the processes of association involved.<sup>2</sup> He names four criteria indicative of the degree of co-ordination of a habit and suggests that the strength of habits may be evaluated by them.<sup>3</sup> The criteria are: (1) Lapse of psychical initiation for habit; (2) Specialty or precision of response; (3) Uniformity or unfail- ingness of response; (4) Difficulty of modifying habitual reactions. These four characteristics manifest themselves in habit, but it would be a difficult task to measure habits by them. Sully contents himself with saying that with these criteria, the highest place in the scale of habitual co-ordinations is that of "the secondarily automatic type of movement, as when one takes out his latch-key at a wrong door. From this downward, there is a series of manifestations of habit with less and less of the characteristics just dwelt upon." This solution of the problem of a classification of habits seems hardly satisfactory, and we shall recur to it later.

Sully gives three main conditions which determine the development of habit:<sup>4</sup> (1) The amount of time and attention given to the movement to make it our own. (2) The frequency with which the particular stimulus has been followed by the particular movement. (3) The unbroken uniformity of past responses. Whether this statement of conditions is adequate,

<sup>1</sup> Sully: *Human Mind*, New York, 1892, I, 56.

<sup>2</sup> *Ibid.*, II, 225-6.

<sup>3</sup> *Ibid.*, II, 228.

<sup>4</sup> *Ibid.*, II, 230.

may be left open here; at any rate, since habit is given a physiological basis, these conditions should be given a physiological explanation. We shall return to this point later. Sully mentions another feature of habit which we can, however, dismiss as falling outside the scope of this paper, namely, the bearing of habit on mental development.<sup>1</sup> Baldwin has made habit one of the two primary laws of the growth of mind.<sup>2</sup> The organism is experiencing repeated processes, and novel processes. Repeated processes are organized in the nervous substrate of mind and come to be functioned without the direction of consciousness. This acquired facility with repeated processes persists as fixed mental capital. Mind can then proceed to accommodate itself consciously to new adjustments, which in their turn are learned and passed over to habit. So the psychophysical organism makes mental progress. This relation of habit to mental development is of course a matter of genetic psychology, and is to be omitted here as our standpoint is that of general psychology.

Stout gives four characteristics of fixed habits:<sup>3</sup> 1. Uniformity. 2. Facility. 3. Propensity: "we are prone to do what we are used to do." The proneness has two manifestations: (a) The more fixed the habit, the slighter the cue necessary and the less liable is the reaction to disturbance. (b) When customary action is interrupted or repressed, the propensity becomes conscious desire. 4. Habitual action is independent of attention.

Stout's statement of the conditions governing the development of habit, notes two factors:<sup>4</sup> (1) "The tendency of any mental process to repeat itself—a tendency which grows stronger, the more frequently the process recurs." (2) The teleological disappearance of conation and attention as the habit is learned, *i. e.*, as the mental processes pass from the attentive to the automatic form. Stout finds a physiological explanation for this second factor in "the tendency of neural systems to a state of virtual stability." A mental reaction involves a disturbance of nervous equilibrium, and conative processes, as in the first steps of learning a habit, represent the regaining of equilibrium. The final learning of an habitual action, so that it is functioned mechanically, means the acquiring of a new center of nervous equilibrium appropriate to the disturbance made by the repeated action. The action now no longer disturbs nervous equilibrium sufficiently to give a basis

<sup>1</sup> *Ibid.*, I, 201.

<sup>2</sup> J. M. Baldwin: *Mental Development in the Child and Race*, 1895, p. 214.

<sup>3</sup> G. F. Stout: *Analytic Psychology*, London, 1896. I, 258.

<sup>4</sup> *Ibid.*, pp. 263 ff.

for conative processes. We shall recur later to the problem of a physiological explanation of habit.

The psychologists so far quoted, James, Sully, and Stout, approach mind from the functional standpoint. Let us hear a structural psychologist as well. Kuelpe, in his "Outlines," gives no systematic treatment of habit. His general problem is:<sup>1</sup> (1) to isolate and classify the mental structural elements, the various sensations and affections; (2) to classify complex processes, as made up of interconnected elements; (3) to investigate the state of consciousness as presenting general differences independent of the contents of experience. With such a programme, he introduces habit solely as one of several factors conditioning sensitivity and sensible discrimination, and hence, to be taken into account in their introspection and measurement. Habituation he defines as a "predisposition of consciousness," or "a tendency taking shape in a series of similar observations to experience and describe perceptions of similar character. . . . In such a series we are apt to find a certain direction and degree of the attention growing habitual and a particular category of judgment becoming preferred."<sup>2</sup> An illustration of what habit means for his system, is given in his inclusion of habituation among the general conditions of tonal fusion;<sup>3</sup> he states that it "lends an added distinctness to the total impression, or the individual constituents of a connection, according as one or the other has been the object of repeated judgment or perception." In another reference to habituation, it is given as one of the determining conditions of feeling, since "under its influence both pleasantness and unpleasantness approach indifference."<sup>4</sup> Kuelpe's only concern with habit is its influence on the structural analysis of mind into elements and their complexes. Mental processes which are repeated a few times come to show slight differences from the form in which they are first experienced. For exact psychophysical determinations, it is necessary to evaluate, or, at least, take into account, such differences. That is all habit means to Kuelpe's system. Were his exposition of the state of consciousness more complete, one might expect further structural reference to habit in an account of differences between the habitual and non-habitual states of consciousness. Neither Kuelpe nor others give such a statement, however. We shall return to it immediately as an important problem regarding habit.

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<sup>1</sup>O. Kuelpe: *Outlines of Psychology*, Trans. by E. B. Titchener, New York, 1895, p. 19.

<sup>2</sup>*Ibid.*, pp. 39, 41.

<sup>3</sup>*Ibid.*, p. 303.

<sup>4</sup>*Ibid.*, p. 261.

There are other writers who might profitably be examined. Enough have been cited, however, to furnish the broad outlines of the subject. Summarizing, it is evident that the functional psychologists have given the subject most attention. The quotations cited have set forth the basis of habit, the conditions of its development, its characteristics, and its meaning for the individual. Kuelpe, a typical structural psychologist, considers habit only as helping or hindering in the analysis of mind into structural elements and complexes. In this examination of the literature of habit, various problems have presented themselves. Of these, we will consider the following three: I. The differences between the habitual and the non-habitual states of consciousness: (A) as regards pattern or form of arrangement of parts; (B) as regards specific processes present in the one and not in the other. II. A classification of habits. III. The development of habits.

#### THE STATE OF CONSCIOUSNESS WITH HABITUAL FUNCTIONING.

Habit, as we have seen, is a particular mode of mental functioning, antithetical to non-habit. Every mental process has either been in consciousness before, or is entirely novel. Processes of the first sort are included under habitual functioning; of the second, under non-habitual functioning. The present enquiry asks what are the differences between the states of consciousness with these two kinds of functioning. The enquiry breaks into two parts.

##### *A. The Difference in Pattern or in Arrangement of Parts.*

(1) The first distinction to be included under this head is a quantitative one: the conscious processes of habitual functioning are few and meager as compared with those of non-habitual functioning. Non-habitual processes bulk large in consciousness; habitual processes bulk small. Compare for example the mental processes with the familiar act of writing one's signature and those with the non-habitual act of writing words backward. Examining the former consciousness, one finds the conscious impulse which started the signature writing and the mass of tactual, movement and visual perceptions set up by its movements. There is no series of conscious impulses initiating the part movements of the writing, or any conscious direction of them. One may assume, with James, that each part movement is set off, without volition, by the vague, unattended-to perception arising from the preceding part movement. Let us examine these two states of consciousness more in detail with a view to quantitative differences.

One may examine the habitual consciousness with signature



writing in three ways. (a) By attending to the writing in a general way, it becomes the most prominent part of consciousness. The processes prominent, however, are not the impulses directing the part movements, or the perceptions arising from the part movements. That is, the processes of the habitual functioning itself do not stand out in consciousness. The prominent processes are the mass of resulting perceptions, more or less differentiated into parts, or some suggested process, as a thought regarding the purpose of the writing, the peculiar shape of the letters, or a memory of writing the signature in starting a bank account. The processes which actually direct the part movements are meager and loom small in consciousness. (b) If attention be concentrated closely on the conscious direction of the part movements in the habitual writing, and all other processes be inhibited, in an attempt to make these habitual processes large in consciousness, one finds the habitual functioning changed into non-habitual. There are at once checkings to the smooth, mechanical course of the habit, and the writing is marked with effort. It is impossible to bring the mental processes of habit into prominence in consciousness, and maintain the habitual form of functioning. (c) If attention is directed in neither of these ways, the sparse processes which direct the habitual part-movements drop out, and other processes quite unrelated to the signature fill the field of consciousness. So, while writing, I spoke to a friend who came into the room, listened to the wind outside, and experienced other extraneous mental processes. The facts, that on the one hand, the familiar writing goes on uninterrupted by related and unrelated simultaneous processes, and, on the other, that it is impossible to make the direction of habitual movements prominent in consciousness without destroying the habitual form of functioning, indicate the small bulk of the conscious processes in habitual functioning.

In non-habitual functioning, on the contrary, as in writing words backward, the mental processes accompanying the act stand out prominently. There is a tangle of processes including the selecting of letters to be written, the rejecting of others, and visual and auditory images of the words whose letter-order is being reversed. The enumeration of these processes indicates their bulk. They fill consciousness completely, excluding other processes unless these be habitual. So, for example, the tangle of non-habitual processes involved in choosing letters in an unusual order, is accompanied by the slightly conscious habitual processes of writing the letters when chosen. Additional non-habitual functioning, however, is excluded. While writing words backward, some one spoke to me and the unfamiliar movements stopped until the interruption was past.

With signature writing, however, the habitual processes ran their course undisturbed by the presence of other processes, as of speech, audition, and memory. This fact of itself, indicates the relative meagerness of the mental processes with habitual functioning, and the fullness of processes with non-habitual functioning.

It is a fair question how "full" the non-habitual process, and how "meager" the habitual process may become. The former may occupy practically the entire field of consciousness as in the scientist's absorbed thought on some new problem, or in an instant of complete concentration with the beginner in dancing. On the other hand, the habitual processes may move temporarily outside the field of consciousness, as when while walking one becomes entirely "wrapped up" in some problem, and yet continues to walk, though unconscious of the movements. In such a case, the perceptions of part movements which serve each as a cue to the succeeding part movement, become so vague that they may be regarded as subliminal excitations. This again indicates the meagerness of the conscious processes in habitual functioning.

Concluding this point, it seems established that mental processes with habitual functioning are few and meager compared with those of non-habitual functioning. With the former, other processes in consciousness are possible and usual; with the latter, other processes, unless habitual, are excluded.

One may think of the difference between the habitual and non-habitual consciousness in terms of a cross-section of mind. Then the habitual consciousness in cross-section shows a small low wave representing the meager habitual processes, and in addition a larger wave representing the incidental processes, habitual or non-habitual, which may also be present. Were one to illustrate this graphically, one would represent the small wave in heavy lines—to indicate the determining importance of the habitual processes—and the large wave in light or dotted lines, to indicate the incidental presence of other processes. The non-habitual consciousness in cross-section shows a large, high wave representing the bulky processes of non-habitual functioning. Graphically, the large wave would be represented in heavy lines, to indicate its importance in the consciousness; the cross-section should also show, in lighter lines, a low wave to indicate habitual processes, small in bulk and in importance, which are also present, usually, in the non-habitual state.

(2) A second difference in the pattern of the habitual and non-habitual states of consciousness, arises from the fact that non-habitual functioning is consciously attended to and habitual functioning is not. This introduces into the former the

distinctions of the attentive state, in which processes attended to stand out clearly and distinctly and those attended-from are less clear and distinct. So we have in the non-habitual consciousness a pattern with two degrees of clearness: the processes of non-habitual functioning are relatively clear and distinct; and other parts of consciousness, the inhibited interfering processes and accompanying habitual processes, are vague and indistinct. The simple habitual consciousness, shows but one degree of clearness; the habitual processes are of the less distinct shading. It should be said, however, that the habitual consciousness is ordinarily not so simple in experience; but includes, in addition to vague habitual processes, others which have the character of non-habitual processes and which stand out with clearness. These differences will come out more distinctly in illustrations. In writing words backward, the non-habitual processes of selecting the letters to be written, not only bulked large in consciousness,—they were clear and distinct. Along with them ran indistinct processes; a vague consciousness of my surroundings, inhibited auditory perceptions, and dim perceptions from the familiar movements of writing. The unfamiliar processes which were attended to had one degree of clearness, they were distinct; the other processes attended-from had another degree, they were dim and obscure. With the familiar signature writing, on the other hand, the processes of the functioning showed but one degree, that of vagueness. If other processes, as those involved in perception, or thought, incidentally came into consciousness during the habitual functioning, they could be attended to, and, as a result, rise into the higher degree of clearness. The habitual processes of themselves, however, remained in the dim, somber background of consciousness.

This distinction in distribution of clearness in the habitual and non-habitual states comes out more plainly in the contrast between the mental side of an occupation like typesetting which involves an habituated routine, both mental and muscular, and one like reporting which deals with a succession of novel situations. Consciousness in the former case is of an almost exclusively habitual type; in the latter, non-habitual processes are prominent. The consciousness of the typesetter who has been doing straight newspaper composition for years, shows in general, we may believe, but one degree of clearness, the dim gray of habitual processes. The sight of the phrase in his copy and of the case before him, the feel of the stick in his hand and the line growing under his thumb, the pressure of the types as he picks them up—these form the mental side of his work and are represented in consciousness by processes of which he is normally scarcely conscious. They give his con-

sciousness a prevailing shading of the less degree of clearness. Occasionally, extraneous ideas, thoughts about the content of the copy, come into mind, or perhaps there is a moment's attentive work in adjusting the spacing of a line, and then, for the moment, processes of the brighter shading stand out against the dim gray of the habituated processes. Take his consciousness the day through, however, and it is essentially a dull monochrome, the characteristic of habitual functioning.

The consciousness accompanying the reporter's work is quite different. It is essentially non-habitual. He must be on the watch for every situation which promises news, and when such a situation is found, he must develop rapidly its every bearing and detail. This non-habitual mental functioning must be done under keen attention. Hence the mental processes involved are at the higher grade of clearness. Other parts of his work, however, the familiar questions used in interviewing, the developing of typical news-situations, are soon matters of routine, and the corresponding mental processes take on the obscure gray of habituation. So his ordinary consciousness shows the two degrees of clearness which mark non-habitual functioning, the clearness of non-habitual processes, and the obscurity of accompanying habitual processes. The typesetter's consciousness, on the other hand, is an habitual consciousness of almost a pure type: its processes show, in general, only the obscure shading of habituation.

(3) A third structural distinction between the habitual and non-habitual consciousness is in regard to the interconnection of part processes. We have noted that in complex habitual movements, like walking, it is enough to start the movements voluntarily. The chain of movements then runs out of itself. I make up my mind to go to the post office and start out. This much involves attention and is a voluntary act. I walk down the street, turn the familiar corners, and, without a thought of my movements, keep my mind busy with other matters till I find myself at my destination. The inception and conclusion of the long series of movements were conscious. But I gave no voluntary direction to the intermediate movements. So, as I write now, I form letters in a particular way, and join certain letters in a definite order to express a word which is in my mind; the word is conscious but I dash off its written symbol, involving a series of delicate, complicated muscular adjustments, and each part movement comes into its proper place smoothly and rapidly without conscious direction. The antithetical characteristic of non-habitual functioning is noticeable in learning any new adjustment, *e. g.*, learning to write in childhood. How slow and painful the child finds it! The up and down strokes and curves are drawn only under dis-

tinctly conscious direction. The pen goes wrong and must be checked by conscious inhibition; it goes right only as proper movements are voluntarily initiated and directed. At every step, right and wrong paths of movement lie open, and the child must choose consciously between them. The adult has a similar experience in learning golf, bicycling, or any set of muscular adjustments. He consciously inhibits wrong movements, and initiates right ones. In short, non-habitual processes are at loose ends, and attention must seek out the proper part movements and connect them up to secure the result desired. The penman and skillful golf player, as we have seen, have organized the part movements, so that once initiated the chain of movements runs through its course, without the hesitations and conscious choosing of paths experienced by the beginner. This characteristic of habitual functioning is to be explained in terms of association; the acquiring of a habit means the acquiring of a fixed series of associations. Each part movement has been welded to the preceding part through repeated co-existence in experience, so that the perception arising from the performance of the earlier acts as a cue to the following part. Each term calls out its succeeding term in the fixed series, and no other processes. By repetition, the complicated movement has become a series of associated links; the performance of the first evokes the second without volitional assistance, the second evokes the third, etc. There is conscious initiation of such a movement and a consciousness of its close, but its performance may become quite unconscious.

Such phrases as the "ease," "rapidity" and "smoothness" of habitual functioning, and its "automatic," "mechanical" and "instinctive" character, have their warrant structurally in the fact that habitual functioning is in terms of a series of organized associations, each term of which calls out its proper successor immediately and unconsciously.

Non-habitual functioning, as one's first effort at skating or piano playing, presents opposite characteristics; it is slow, difficult, uneven. Looked at from the standpoint of association, there is no fixed linking of step to step; each succeeding part movement must be selected consciously. The performance of one part of the movement suggests not a single associated step to follow, as in habit, but many associated steps from which the one most suitable to the end in view must be chosen. The attention, fixing on this one, brings it out clearly in consciousness while other processes are inhibited. The functioning follows the path selected. The same procedure is repeated for the next term—a mass of associated steps is suggested, some more prominently than others. Attention works over the mass, selects the most suitable one, which is followed out, and the

next link in the chain is forged. The association of steps thus joined persists and shows itself in greater facility when the series is repeated. Repetition strengthens the linking of part to part, and in time the series functions mechanically, each part suggesting only the proper succeeding part, and this without volitional direction. The non-habit has become a habit.

The relation of association to habit and non-habit throws light on the apparently anomalous fact, that it is impossible to attend to the parts of an habitual complex and consciously direct them without destroying the habitual functioning, making it non-habitual. Attention to any mental process, according to Kuelpe<sup>1</sup> means physiologically a "preparedness" for its neural correlate. The preparedness consists of two factors: an increased excitability of the cortical path or cells corresponding to the idea, and an opening up of the neural paths of its associated ideas. The neural processes underlying other non-associated ideas are inhibited. As a result of this preparedness, the idea attended-to comes into consciousness more clear and distinct than other ideas, and is rich in associations. Apply this to habitual functioning. Such functioning, as we have seen, is mechanical and rapid, each term unconsciously calls out its habitually succeeding process, and no other processes. Let attention now be focused on the direction of a part movement; the cortex "prepares" for its neural process. The corresponding cortical center is increased in excitability and its associated paths of functioning are opened. With habit, but one such path was opened, the one standing next in the organized series; now, many offer themselves for the successive step in functioning. The situation is exactly as in non-habitual functioning. There are many possible ways of functioning opened and a decision must be made among them. The decision is made as follows: the most "prepared" path, which is the one having among its associated ideas the end being sought, *i. e.*, the one which best leads toward that end, is thereupon attended to and the functioning follows along it. Attention to the part process opened up many possible paths; and, once opened up, a selection from them by means of attention was necessary. This arousal of possible paths and choice from them is repeated for each term as long as attention is focused on the part processes of the habit. But this is non-habitual functioning—slow, conscious, uneven. Habit becomes non-habit under attention, because attention to a part process arouses the processes associated with it, and functioning through such a tangle of processes is necessarily non-habitual.

Another fact to be considered in connection with association

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<sup>1</sup> *Monist*, October, 1902.

is the initiation required to set off an habitual reaction. Sometimes volition is present. I decide to go walking, or to go to bed, or to eat lunch, and the habitual complex starts and thereafter runs, at least in its mechanical parts, without conscious direction. In completely mechanized habits, however, no active volitional initiation is necessary. A perception or idea quite unattended to may evoke the habitual response if it is not volitionally inhibited. I rarely go to my sleeping room save at night, and then always throw on the electric light as I enter. On two or three occasions when entering during the day and busy in thought with something else, I have unconsciously turned on the light. The perception aroused by entering the room had been habitually associated with the movement, under one set of conditions, darkness; and the reaction followed even under irregular conditions. Ordinarily it would have been inhibited, but volitional processes were focused elsewhere. There is always some stimulus to an habitual reaction, and as this illustration shows, it need not be volitional. Some perception or idea which has been in the past associated with the habitual function is sufficient, even if unattended to, and scarcely conscious. Volition, in such cases, is concerned only negatively: it must not inhibit the reaction.

It may be said, without offering details, that to the fact that habit is an organized series of associations is due some of its characteristics which Sully and Stout note: its "uniformity," "unfailingness," "specialty or precision in response," and its "propensity" in so far as this last term indicates the readiness of a habit to respond to a slight cue. We shall say more of propensity presently.

Summarizing this account of the differences in pattern in the habitual and non-habitual states of consciousness, we may say that in the habitual state the processes are (1) quantitatively meager, (2) uniformly indistinct, and (3) are interconnected as a series of associations so that each term unconsciously evokes the succeeding term; in the non-habitual state, the processes (1) bulk large in consciousness, (2) are of two grades of distinctness according as they are attended-to or attended-from, and (3) are joined together in the functional series only as a result of conscious choosing and rejecting.

#### *B. Distinctive Processes of the Habitual and Non-Habitual Consciousness.*

The attentive state, over and above its characteristic pattern of distinct processes at the focus and indistinct processes at the edge of consciousness, has a characteristic process, effort, which distinguishes the attentive from the non-attentive state of consciousness. Our second and present enquiry is regarding

processes which in a similar way may be peculiar to the habitual and non-habitual states.

(1) The distinctive characteristic of the habitual consciousness is its feeling-tone or mood. When a process reappears in consciousness it is accompanied with a mood of familiarity, or "at-homeness." With further repetition, as the process becomes thoroughly habituated and mechanical, the mood shades off into vague and scarcely-conscious indifference or "of-courseness." For example, I am introduced to a stranger and next day meet him on the street. His name, a repeated mental process and hence slightly habitual, flashes into mind, and the mental processes include a mood of familiarity. Let me meet him daily and the mood of familiarity accompanying his name in consciousness speedily diminishes in intensity. I soon speak his name mechanically, and as "a matter of course" and the accompanying consciousness is quite indifferent in feeling-tone. In a similar way, as one repeats a trip through a strange part of a city, the processes called out by the sight of business houses seen before and by following the turns previously made, are marked by a feeling-tone of familiarity. Further repetition of the walk reduces the intensity of the mood and it passes over into indifference. So one comes to use the rules of arithmetic, pass to and fro in accustomed surroundings, recall the familiar names of friends and go through entirely habituated bodily adjustments, and in all such habitual functioning, the mental processes are accompanied by no distinct feeling-tone. They are quite indifferent. Yet they may be regarded as contributing positively to the vague feeling-mass of "naturalness" or "of-courseness" which forms the dim background of consciousness. A hint of what the indifferent-of-courseness of habit means to mind may be had when an habitual function is interrupted, and a feeling of unpleasantness due to the interruption succeeds the of-courseness. If a familiar object is removed from one's room, if one's daily routine is interrupted, or if a name which one uses familiarly suddenly goes from mind, each such interruption of habitual functioning is accompanied by an unpleasant feeling. At the moment this succeeds the mood of "of-courseness," one is conscious that the latter contributes something to the vague feeling of naturalness in the background of consciousness. Habitual functioning is therefore characterized consciously by the feeling of familiarity; and in thoroughly organized habits, by the indifferent mood, termed "of-courseness" or "naturalness." Interruptions of habitual functioning are unpleasant in feeling-tone. This gives us the distinctive process in the habitual state of consciousness.

This affective characteristic explains in part the "impulsive-



ness" or "propensity" of habit, which we may consider for a moment. Reid<sup>1</sup> says that habits often involve not only facility in action but "inclination or impulse toward action," and Stout, as we have noticed, includes "propensity" as a characteristic of habit. This characteristic seems explicable by two factors. (a) The first is that of association, already mentioned. Each term of the habitual series calls out its succeeding term without volition, and the series may be initiated without volition by the presence of the perception or idea which has been associated with it as its cue. This fact accounts in part for "propensity" toward habitual functioning. Such functioning is in the line of the least resistance, both as to initiation and progress. A situation is presented in which one may speak truly or falsely. If in one's past experience truth-speaking has been the next associative term in similar situations, it is easier now to speak truly than falsely. Truth-speaking is unconsciously suggested as the next term in the functioning, and this term follows without volitional direction. In a similar way, if the hour of five has been associated daily with taking a walk, the arrival of that hour to-day suggests the walk. It is easier to follow the habituated association than to form a new one. We may say, then, that the propensity toward habit is explained in part by the slight initiation it requires and by its non-volitional course, both of which are referable to the fixity of association. (b) The other factor is the affective processes involved in habit. Habitual functioning is accompanied by the mood of familiarity, or, if the habit is mechanized, by the vague mood of "naturalness" or "of-courseness." If habitual functioning is interrupted, there is a feeling-tone of unpleasantness. These affective processes both favor habitual functioning, as against non-habitual. Telling the truth contributes to the mood of naturalness. If one hesitates to speak the truth, habitual functioning is interrupted and the unpleasant feeling resulting impels to truth-speaking. False-speaking similarly breaks in on habitual functioning and is therefore unpleasant. The affective processes favor the habitual functioning, the truth-telling. Just so, with the habitual walk: following the regular sequence adds to the vague general feeling of naturalness and of-courseness; breaking the sequence, is unpleasant. Hence there is inclination to follow the habitual order. The "impulsiveness" or "propensity" of habit is to be explained, then, by the ease of functioning in the associated order, and by the influence of the affective processes concerned. Summarizing this section, we may say that the distinctive process in the habitual consciousness is its mood of familiarity

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<sup>1</sup> Thomas Reid : *Essays on Active Powers*, Essay 3, Chap. 3.

with partly habituated functioning, and of vague indifferent naturalness with entirely habituated functioning. This affective characteristic of habit, together with its organization as an associated series, explains its impulsiveness.

(2) The distinctive process in the non-habitual state of consciousness is the experience of directed effort. This is plainly present in learning a new muscular adjustment, as swimming, typewriting, or the playing of musical instruments. The innervation of the proper muscles, to the proper amount, and in the proper sequence, and the inhibition of false movements, are accompanied with a consciousness of effort. The effort, further, is directed; namely, toward the organization of a series of movements which will give the desired adjustment. The end is conscious and the choosing and rejecting of movements is directed toward accomplishing it. Moreover, the feeling of effort is localized in the muscles, or the tendons of the muscles, which are being adjusted—in the finger muscles in learning the piano, in the leg and arm muscles in learning to swim. There is present, too, the general set or brace of the whole body which is always a factor in effort.

The experience of effort may be traced also in non-habitual functioning of the intellectual type. If I go into a shoe store to inspect a pair of shoes, a series of habitual processes runs through mind corresponding to my questions: "Are these shoes well made? What kind of leather? What sort of a sole? Is this in the spring style? The price? etc." The questions seem to suggest themselves, without any consciousness of effort, when I am in the familiar position of shoe purchaser. I attempted, however, to think myself into the unfamiliar position of the shoe dealer and conceive what judgments he might pass upon the shoes. I could do it only with effort. The end in view was conscious and the necessary steps toward it were made volitionally. The processes included a determination of the points of interest in the shoes for the dealer, and the judgments he might make upon them. I conceived him as thinking: "The cost of these shoes to me? Do they seem to fit and please the customer? My profits if he takes them? The grade of leather in them? Their manufacturer?" I arrived at these unfamiliar mental results only with consciously directed effort. The feeling of effort was localized physiologically about the eyes, as the shoes were examined visually, and the thinking was largely done in visual terms.

Feeling experiences, too, so far as volitional processes are concerned in them, show the same characteristic of the effort factor in non-habitual functioning. The effort, be it noted, attaches itself not to the affective side of the experience but to

the perceptions or ideas present, *i. e.*, just as it is impossible to attend to the affective side of an experience, so it is impossible to make it the basis of effort processes. One has an example of non-habitual functioning in feeling whenever an æsthetic or other judgment of sentiment is made. For example, I see a famous picture for the first time and study it carefully, passing judgment upon it point by point. The mass of processes is affectively toned and the experience is conative. The next time I examine the picture, as far as judgments once made under effort are repeated, they are repeated with diminished effort or without effort. As the picture becomes familiar, the judgments once made are accepted and used without actual conative acts of judgment. In all feeling experiences, the effort which attaches to the perceptions and ideas behind the feeling, is present only in non-habitual functioning. As in other cases, effort is directed toward an end—in the illustration cited, the forming of æsthetic judgments. This applies to one's feeling attitude toward countless things in art, in ethics, in religion, and in intellectual or logical thinking. For every such attitude intelligently taken, and not accepted at second hand, there was an original process of non-habitual conative judgment, affectively toned. As the results of the judgment came to be habitually used, the conative processes dropped out. The feeling attitude is thereafter taken without effort. There are many feeling experiences, the emotions of joy, sorrow, fear, etc., and the feelings proper, warmth, thirst, weariness, etc., in which no such processes of judgment are involved. The attention is passive, and the effort experience as in all passive attention is weak. It would be difficult to differentiate habitual and non-habitual feelings of this sort, by the effort factor. There is another criterion, however, which may be applied to such feelings and indeed to all feeling experiences: non-habitual feelings are relatively intense; with repetition, both pleasantness and unpleasantness approach indifference, whether present in a feeling proper, an emotion, or a judgment of sentiment. This general statement was implicit in our treatment of the feeling-tone of habitual functioning which diminishes in intensity with repetition, passing from the mood of familiarity to that of indifference. Other examples might be cited of this general characteristic of feeling experiences: a new suit of clothes is worn with pleasurable feelings for a few days, but in a couple of weeks it is quite a matter of course and calls out no affective reaction. Unpleasant feelings likewise decrease to indifference. On one occasion I had to work for some time under unpleasant circumstances which irritated me not a little at first. In a week or so, I was disregarding them; they had become indifferent.

Summarizing this discussion, it may be said that the directed effort experience is the distinctive process in non-habitual functioning. With feelings, further, all non-habitual processes are relatively more intense: as they become habitual, they pass to indifference.

Placing together the results of this section, we note that the non-habitual consciousness is distinguished, as just stated, by its effort experience and the relative great intensity of any feeling processes present; the habitual consciousness, by its mood of familiarity for repeated and partly habituated experiences, and of indifferent-of-courseness for thoroughly habituated experiences. For the sake of summary, we may recall the differences in pattern noted in the preceding section: the processes of the habitual consciousness bulk small, are uniformly indistinct and are fused together in an associated series so that each term unconsciously calls out its proper succeeding term and only that term. The processes of the non-habitual consciousness bulk large, are of two degrees of clearness, distinct and indistinct, and are consciously joined together as terms in the functioning series by attentive selection and rejection.

#### A CLASSIFICATION OF HABITS.

As we stated at the outset, habit is a mode of mental functioning in which repeated processes are in mind. A habit is one such mode of functioning; and there are as many habits as repeated processes. How can we classify them? A preliminary statement of the concept of nervous tendency in its connection with habit will assist us. A nervous tendency is a particular modification of the nervous system favoring a definite sort of functioning. Two men receive the same objective stimulus, from a green field: one thinks, "how fine for a golf course," the other, "what a good pasture it would make." The two nervous systems reacted differently because of their individual peculiarities, the nervous tendencies present in each. Habit, as we shall explain in a later section, is at bottom, a physiological phenomenon. The acquiring of a habit means the development of a persisting nervous modification, a "tendency," which expresses itself in the various conscious manifestations of habit. It will be convenient to speak of an "habitual tendency," meaning the particular neural modifications underlying an habitual mode of functioning. By examining the manifestations of habitual tendencies, one comes to a first basis of classification.

##### A. *Specific and General Habits.*

Every mental experience possesses in some degree the possi-

bility of reappearance in consciousness. I can recall the mental experiences of the instant just passed, but for most such experiences, the possibility of recall is brief. I remember the dishes at dinner to-night, but I have no idea what was served yesterday. I recall a deep snow in December, but other weather conditions during that month are gone beyond recall. I had to derive a mathematical formula a few days ago which I had not looked at in some years; after working at it a bit, I caught a cue and the derivation almost ran through of itself. In each of these cases where a mental experience is revived, one assumes that the original experience left a trace in the nervous substrate of consciousness making possible the recall of the mental processes. Similarly in learning a muscular adjustment, as tying a new form of neck-scarf, the first performance may be carried out only with difficulty; but the mental processes leave an effect in their substrate, a tendency, which makes a repetition of the same movements easier. Behind the habitual performance of a daily routine, one assumes a set of nervous modifications, developed by earlier performance of the duties, which provide for their machine-like repetition day by day. When I have once formed an opinion on the Sistine Madonna, this opinion comes into mind at once if Raphael's painting is being discussed. I do not wait to form a new opinion; the one which has been in consciousness before, reappears. In each of these cases, a particular set of mental processes is experienced, and an habitual tendency brought about which facilitates the re-experience of the same specific processes. Such a mode of functioning may be termed a specific habit, or, since mental contents are repeated, a habit of content.

Habitual tendencies, aside from providing for the re-experiencing of specific processes, manifest themselves by shaping the course of other processes in consciousness. One day in January the weather bureau reported a fall of  $34^{\circ}$  in temperature and a wind of 30 miles an hour. The facts were unusual and have come into mind many times since. More than that, for two or three days after the cold snap I was weather-minded. I scanned the papers to watch the progress of the storm elsewhere; I found myself discussing the weather, an unusual topic for me; and I inquired from a friend just back from New York, as to the weather there on the day of our blizzard. The habitual tendency persisting from the original experience manifested itself first in the re-experiencing of the specific processes; and secondly, in a more general way, by giving a certain form to consciousness in accord with the earlier experience. The habitual tendency which underlies truth-telling is of this more general character: it does not provide for the re-experience of specific processes, but determines a general form of func-

tioning which shapes whatever processes may be in mind so that their expression is truthful. Similarly, with the habits of punning and answering letters the day they are received, mentioned by Stout. In each, the habit determines the form of consciousness; in one case punning, in the other answering the letter at once. It does not determine the specific pun or the contents of the answer made to the letter. It is evident that we have here a second form of habitual functioning which may be called a general habit, or since it determines the form of consciousness, a habit of form.

Both sorts of habit find illustration in the "professional mind." On the one hand, the mental processes corresponding to the facts of the profession, *e. g.* law, are at the instant service of consciousness, so strong are the habitual tendencies favoring their re-experience. These are specific habits. On the other hand, the continued experiencing of the mass of related processes, which form the mental side of a profession like law, develops general mental habits in accord with these experiences. The lawyer's thought shows the impress of these habits; it follows legal logic. The memory of the professional man is best for the facts of his profession; he easily masters new situations within his field while he may be incompetent outside it; his interests are those of his profession, so that, if a lawyer, he enjoys Blackstone, while a scientific monograph would bore him. These are evidently manifestations of general habits which give varying form to consciousness in different individuals. Their influence is clearly illustrated in the different reaction which various minds make to the same situation. Let three men, an artist, a farmer, and a railroad man look out over the hills about Ithaca. The first will probably be enraptured with the beauty of the scene, the second will wonder about the quality of the soil on the hill tops, and the third will remark that there must be heavy grades on the railroads entering the city. The artist has in the past experienced mental processes pertaining to the beautiful, and so has acquired a general habit of thinking in terms of the æsthetic. His present mental experiences are shaped by this general habit. Similarly, with the farmer and the railroad man. General habits are of the most far reaching significance as accounting in part at least, for differences in mental constitution, type and temperament. In part, the tendencies that determine these manifestations are doubtless hereditary; very many of them, however, are habitual tendencies built up by past mental functioning, which persist and determine the course of our mental life in the present.

From this point of view habits may be regarded as of two kinds, specific and general. The former function in mem-

ory, imagination, thought, bodily movement, etc., in which specific processes experienced in the past, reappear in consciousness. The latter function in habits of thought, attitude and volition in which novel processes of the present are shaped in accord with the experiences of the past. The bearing of the following statement from James on this distinction, is clear: "It is not simply particular lines of discharge, but general forms of discharge that are grooved out by habit in the brain." There is possible, also, another classification of habits.

### B. *Levels of Habit.*

Sully, as we noted in examining his treatment of habit, attempts to measure the "degree of habitual co-ordination," or the strength of habits, by using various characteristics of habit as criteria. But he only succeeds so far as to say that the highest place in the scale is that of "the secondarily automatic type of movement," and that "from this downward, there is a series of manifestations of habit with less and less of these characteristics." We have seen that habitual tendencies manifest themselves in two ways, providing for the re-experiencing of specific mental processes and exerting a shaping influence on consciousness. We might find in the persistence of the former characteristic and in the degree of the latter, the basis for a quantitative classification of habit. Such a measure would be difficult to apply directly. Titchener, however, has suggested a division into "levels of habit"<sup>1</sup> in which the lines of demarcation are primarily in accord with the sources of the habituations. By combining his "levels" with a rough application of the measure just suggested, we arrive at a fairly satisfactory classification of habits.

Habits whose basis is simply recency of occurrence are least persistent, and exert the least influence on consciousness. They form the lowest level of habit. The miscellaneous everyday experiences of only ordinary interest belong here. We remember them for a longer or shorter period varying with the depth of the impression they make upon us. They may also influence one's other conscious life for some little time, as did the unusual weather conditions. There is very little of last year's daily experiences of this sort, however, which is remembered now or which influences consciousness in a way one can be aware of. In other words, the tendencies resulting from this miscellaneous, unrelated daily functioning do not persist for any length of time. Habits of this level may be called temporary habits. Every one has the experience, however, of some scene of childhood or later life which does persist, both being

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<sup>1</sup>E. B. Titchener: *A Primer of Psychology*, 1898, p. 137.

re-experienced and exerting influence on other conscious processes. Such experiences for some reason made such an initial impression, that the resulting tendency persists for years, perhaps for life. They belong rather to the second level of habit.

Habits arising from mental experiences of unusual intensity or interest, form the second level. They are of more than usual persistence and influence on consciousness. Eating chicken is not an uncommon occurrence, and one would scarcely expect it to give rise to a persisting tendency. I ate some at a restaurant a few years ago, however, which made me ill, and I not only have a vivid recollection of that particular experience, but the tendency resulting from it still occasionally affects other conscious processes, as in making me view with suspicion chicken on a bill of fare. I have a friend whose brother was killed in the Spanish war. The habitual tendency resulting from the grief and the shock of the news persists so strongly that the sight of the national colors is enough to recall the tragic death of the brother. The memory of that single experience five years ago will doubtless be subject to re-experience throughout his life; and at the same time, the tendency making possible its recall, will influence other parts of consciousness, as his attitude toward war and international arbitration. We seem justified, then, in placing in a separate class, which we call the second level of habit, all those habitual tendencies which arise from mental experiences of extraordinary intensity, and which show an unusual degree of persistence and of influence on consciousness.

A third level of habit includes those tendencies to habitual functioning which grow up about the more or less related experiences of one's profession or employment. This class of habits is characterized as arising in adult life, rather than in youth, and as being based on the habitual round of daily activities. The definite limits of the "technical memory" and its high efficiency within those limits, professional ways of thinking, the fact that the predominant interests are those of the profession,—all point to the existence of strong tendencies arising from the habitual activities of one's occupation. Some are specific habits, as those which keep ready the body of definite facts involved in the profession; others are general, as those which shape new mental experiences in the mould of the professional mind. One finds illustrations in the technical knowledge of the engineer, the habits of thought of the lawyer and the mannerisms of the doctor. Every individual is subject to habits derived from the past experiences of his position in life and his round of daily duties, which on one hand determine specifically his knowledge, manual skill, etc., and on the other, as general habits, show themselves in peculiarities of



thought, personal bearing, attitude toward others, and in countless other ways.

The fourth level of habit includes those habits resulting from breeding, education, and early training, in short, the activities and environment of childhood. They manifest themselves in differences of speech, as between a New Englander and a Southerner; in matters of personal attitude, as politeness and courtesy; in such habits as concentrated attention, carefulness, and diligence; in manner of dress and care of the person; and in all those habitual ways of reacting which are fixed before one is twenty-five, and thereafter hold one in an unrelaxing, life-long grip. These tendencies which take shape in the plastic period of childhood, are more deeply seated than the habituations previously mentioned, and exert a stronger influence on consciousness. It is hard to over-emphasize the importance of their influence on the individual. They differentiate the city boy and his country cousin; the product of the slums, and the scion of aristocracy. When these tendencies have once taken form, it is almost impossible to eradicate them—the college boy who puts on the shop-clothes of the mechanic, is still recognizable despite his disguise; he will read a paper while his companions loaf through the noon hour, and “wash-up” at night with a care for cleanliness to which they are unaccustomed—at every turn the habits formed in youth shape his present. The Indian boy taken from a wigwam and sent through Carlisle or Hampton, in many instances, after graduation goes back to the wigwam; the tendencies of his earliest years could not be overcome by later training.

The groups of habitual tendencies so far discussed are alike in that all the tendencies concerned result from mental functioning during the lifetime of the experiencing individual. As such, they are called “acquired” tendencies. In the ordinary acceptance of the term habit, it includes only these acquired ways of functioning. It is convenient, however, for certain purposes,—and it can hardly be confusing,—to treat with the foregoing levels of habit, a fifth level which shall include all those tendencies which are innate in the individual and are hence termed “natural” or “hereditary.” Every normal child is born with a tendency to talk, and with various instincts, as acquisitiveness and curiosity. In addition, there are hereditary tendencies which vary more distinctly with the individual. We say one child is naturally musical, another stupid, another sympathetic, and so on. By this we mean that over and above the shaping influences of environment, heredity determines in part at least the characteristics of the individual. And as far as the mental side of the nature is

concerned, we mean by this hereditary endowment, that there are in every individual innate tendencies, or functional ways of least resistance in the physiological substrate of mind. These hereditary leanings are the deepest seated of all our tendencies, and the most far-reaching in their influence on consciousness. The artist is born, not made, we say; and so each individual has definite predispositions given him at birth which fit him for this or that vocation, and determine to an extent which it is impossible to define exactly, his mental possibilities, temperament, and the general course and character of his after-life. It is difficult to tell just where these hereditary tendencies end and where those acquired through early training and education begin, for in a definite case it may be impossible to trace back a tendency noticed in adult life. The distinction between the two, however, is theoretically clear: acquired tendencies, habits proper, result from mental functioning in the life of the individual; hereditary tendencies are innate. The last class of tendencies manifest themselves more commonly in determining the general form of consciousness; though, in instincts, they may give rise to specific conscious processes. Acquired habitual tendencies show themselves in the one way, or the other, or in both ways.

Summarizing this section, we may say that habit manifests itself in consciousness in two ways, in the reappearance of specific processes experienced in the past, and in shaping new processes in accord with past experiences. So we have specific or content habits, and general or form habits. Further, the classification of habits according to levels, indicates their origin and roughly, at least, the degree of their persistence and influence on consciousness.

#### THE DEVELOPMENT OF HABIT.

The last main division of our enquiry is concerning the development of habit. In explaining what habits are and how they come into existence, we are transferred at once from a psychological to a physiological standpoint. Modern psychology holds as a primary postulate that every mental process is accompanied by a characteristic neural process in the central nervous organs. The explanation of habit is that the passage of a particular nervous excitation, or series of excitations, through these central organs leaves them disposed physiologically for a repetition of the same nervous process. If a mental process is experienced, the passage of the corresponding nervous processes through the brain leaves that organ more ready to function with the same nervous processes again,—hence the correlated mental process is likely to reappear in consciousness. The nature of the nervous excitation is still undetermined; if

we assume that it involves some sort of molecular rearrangement in the path it follows, as seems likely, there is open to us the vivid explanation of habit which James and others give. The excitation leaves a trace or path in the nervous structure, which repetitions of the excitation deepen and widen, as running water digs its channel. The path is maintained permanently by the processes of nutrition, which follow the lines of molecular rearrangement. The persisting path constitutes the tendency to the repetition of the nervous discharge which caused it, and hence to the reappearance of the correlated mental experience. At any rate, whether or not we think in terms of actual "paths" and "canals," we shall find it, at least, necessary to assume that a nervous excitation leaves some structural change which disposes the brain to the reproduction of the same process; and that this structural trace, as we have said, provides, on the mental side, the disposition toward the reappearance of experiences formerly in consciousness. The development of a habit, therefore, means the development of a physiological modification, or tendency.

Assuming this to be the nature of habit, we shall consider the conditions favorable to its development, and correlate them with physiological changes.

1. The habitual tendency favoring the reappearance of mental processes gains strength by repetition of the processes. One learns a poem by repeating its words and thinking through its thoughts again and again. One acquires a muscular adjustment by repeating the movements; and a habit of reflection is secured by repeated processes of reflection before action. The fact is universally admitted that repetition or practice is the great factor in acquiring a habit. This is exactly what a physiological explanation of habit would expect. The first passage of the nervous excitation would leave only a slight trace, perhaps; but repetition of the same excitation would wear the path deeper. The physiological explanation, therefore, furnishes precisely the conditions demanded by the fact that a habit grows strong by repetition of the conscious processes involved.

2. A mental experience of great intensity or interest results, without repetition, in a strong habitual tendency. The case of my friend who lost a brother in the war is in point here. The intense mental experience is doubtless represented on the physiological side by a nervous discharge of great intensity. This, in a single experience, would leave a trace or path of as great "depth" as one resulting from the repetition of a weaker excitation. So, a great flood in a single day tears out a path, which a smaller stream would require years to form.

3. The fact that processes attended to produce habitual

tendencies, while those not attended-to, do not, must be considered. If I give my whole mind to learning a new set of movements, the habituation is much more rapid. The things remembered are the things which were attended to when experienced. The mental processes which later affect the course of consciousness, *e. g.*, the unusual weather conditions which made me weather-minded for a day or two, are similarly the experiences which are attended to. In general, then, if one attends to a mental experience, it gains the possibility of recall and the power of influencing other processes in consciousness; that is, the mental process which is attended to produces an habitual tendency. In Titchener's phrase, "Habit means foregone attention." Neurologically, it seems most probable that attention involves an inhibition of all nervous excitations except those underlying the mental process attended-to; these last are facilitated in their passage through the cortical centers. This gives the nervous excitations underlying the mental process attended-to, a relatively great intensity, though no absolute increase in intensity be assumed; only mental processes attended to, therefore, are represented by neural processes of sufficient intensity to leave a trace in the cortex.

4. The physiological explanation covers, too, facts of mental constitution which are best explained by referring them back to heredity. If a lawyer is legally-minded, the obvious explanation is that the experiencing of great masses of legal mental processes has built up neural paths of tendencies, which determine the form his present mental processes show. The action of the new-born infant in taking food, and its display of curiosity, however, cannot be similarly explained as the result of previous functioning on its own part. The conception of physiological tendencies covers such cases, by assuming innate nervous conditions which provide for certain reactions; conditions similar in influence to those which the individual builds up by mental functioning. So, we get our conception of hereditary and acquired tendencies, which while functioning in the same way, have a different origin. The former are innate modifications of the central nervous organs; the latter are modifications brought about by functioning.

5. Another fact to be considered is the easy formation of habits during childhood. In our discussion of the levels of habit, we noted that the strongest of our acquired tendencies arise during youth. If tendencies have a physiological basis, this would be expected. Growth and the nutritive processes generally, are most active in youth; and the bodily organs are extremely plastic at that period in life. This is especially true of the nervous system. Cortical traces produced by nervous excitations would therefore be deeper in childhood than in adult

life after the nervous organs have "set." Hence childhood would be, as it is, the great period of habit-formation. The physiological explanation fits the conditions exactly.

We may conclude that the development of a habit means the development of modifications, or tendencies, in the nervous system. These neurological changes are occasioned in the central nervous organs by the excitations corresponding to the mental processes of the habit. The chief factors favoring the development of habit are repetition of the mental processes involved, attention to them, the intensity of the experience, and plasticity of the nervous system. These factors all contribute to build up the paths of discharge which are followed by the neural processes underlying the habituated mental experience. The existence of such a path, or in other terms, the presence of the habituation tendency, is the physiological basis of habitual functioning.

#### GENERAL SUMMARY.

This paper has attempted to consider certain phases of the great mass of mental life termed habitual. Habit was defined as the mode of mental functioning in which repeated processes are in consciousness; a habit as the functioning, or form of consciousness, involving a particular repeated experience. Habits, as "modes of functioning," or "forms of consciousness," are not in themselves conscious; a study of habit in consciousness, therefore, is a study of the habitual conscious processes in which habit expresses itself. Heretofore, habit has been treated chiefly from the functional standpoint, in its relation to the individual and with objective reference. In this paper, we have discussed three problems with regard to habit:

1. A statement of the structural differences between the habitual and non-habitual states of consciousness. There are differences in pattern, or arrangement of processes, as follows: The processes in the habitual state are meager, uniformly indistinct, and fused into an associated series; those in the non-habitual state bulk large, are of two degrees of clearness, distinct and indistinct, and are consciously joined together by attentive selection and rejection. Further, the habitual consciousness has as a distinguishing process, the mood of familiarity with partly habituated experiences, and of indifferent of-courseness with those completely habituated. The non-habitual consciousness has as its characteristic process, the experience of directed effort. Feeling processes are relatively strong in non-habitual functioning, and pass to indifference under habituation.

2. A classification of habits. Habits are of two classes: specific habits, which provide for the re-experiencing of past

processes; and general habits which shape present processes in accord with past experiences. Further, habits may be classified according to four or five levels: (a) those depending upon *recency* of occurrence alone for their persistence; (b) those due to mental experiences of great *intensity*; (c) those arising from the professional or other habitual daily activities of adult life, and hence referable to *recency* of occurrence and *repetition*; (d) those originating in training and other influences during childhood, and therefore, due to factors of *intensity* and *repetition*; and (e), if we may pass beyond the acquired tendencies, innate tendencies which manifest themselves like habitual tendencies in their influence on consciousness, and which may be tentatively regarded as the resultant of all the factors of habituation in some way racially summated. The order of levels indicates roughly the degree of persistence and of influence on consciousness of the habits in the various groups. Instinctive habits are strongest. Habits which exist simply through recency of occurrence are, other things equal, the weakest.

3. The development of habit. Habit involves neural modifications, or tendencies, which are brought about, save such as are hereditary, by the neural excitations underlying habitual mental processes. The important conditions favoring the development of habit, are repetition, attention, intensity of the experience, and plasticity of the nervous system.